

SOME OBSERVATIONS ON DOL (BAG) NET FISHERY AT SASSOON DOCK, BOMBAY¹

S. KRISHNA PILLAI²
(With four text-figures)

The paper describes the species composition of the Dol (Bag) net catches at Sassoon Dock, a major landing centre in Bombay, from January to December, 1971, grouping them into two main categories, those occurring throughout the year and the those having seasonal occurrence and then reclassifying them into market categories. The estimated dol net catches fluctuated between 275 and 1485 tonnes during the year. The monthly average catch was 829.5 tonnes which formed 41.6% of the total landings. A list of 33 species caught in Dol net and their percentage composition is given.

INTRODUCTION

The Dol net is an important gear used in Bombay-Gujarat coasts, mainly for catching Bombay duck, *Harpodon nehereus*, third in importance in respect of marine fish landing in India and non-penaeid prawns like *Acetes indicus*, *Palaemon tunuipes* and *Hippolysmata ensirostris*. The Bombay duck forms 14.10% and 20.85% of the total catch of Maharashtra and Gujarat states respectively, while the non-penaeid prawns form 58.35% and 4.50% of the total prawn catches of the above states respectively. (C.M.F.R.I. Annual Report, 1976). The operation of the 'Dol' net has been described by Pillai (1948), Hornell (1950), Setna (1954) and Gokhale (1957).

Gokhale (1957) mentioned that *H. nehereus* was taken along with *Coilia dussumieri*, species of *Penaeus* and *Metapenaeus*, immature *Stromateus cinereus*, *Trichiurus savala* and a few other less important species in Saurashtra waters. Chowdhury (1970) estimated the landings of

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² Present address: Mandapam Regional Centre of C.M.F.R. Institute, Mandapam Camp, Tamil Nadu.

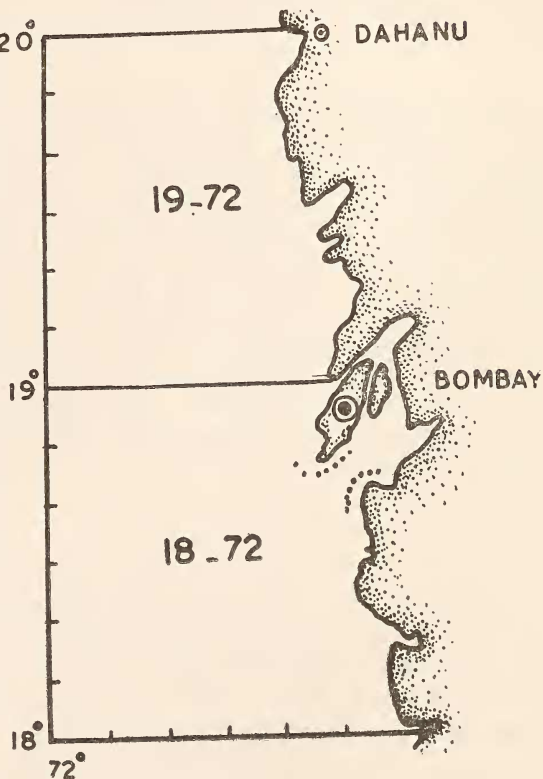


Fig. 1. Map of Bombay harbour, Sassoon dock showing the nearshore Dol net fishing grounds.

fish at Sassoon Dock for a period of two months only. Apart from this there is no detailed published account of the 'Dol' net catches. The present paper deals with the catch composition of the fish caught by 'dol' nets operated between 15 to 20 km. from Bombay harbour and landed at Sassoon Dock from

the species composition of the catch and their weight. The total catch and catch composition of species were estimated based on the average catch of unit. Stratified Random sampling method adopted by Fishery Resources Assessment Division of C.M.F.R.I. was used for the estimation of the total landing as given below.

Total landing for the observed units	X	Total No. of units landed during the observation period
No. of units observed		
The estimate of catch for a day was obtained by adding the estimates for the forenoon (0.6.00-12.00 hrs), afternoon (12.00-18.00 hrs) and night landings. The estimate for the month was obtained by the formula given below.		
Total of the estimated landing for the number of observed days	X	No. of landing days in the month
No. of observed days		

January to December, 1971. These observations formed part of the work of the survey programme for resources assessment.

Sassoon Dock, situated in South Bombay, is one of the biggest fish landing centres (Fig. 1). Though the landing takes place round the clock, the activities have two peak periods, once in the morning between 0.6.00 to 0.8.00 hrs. and again in the afternoon from 13.00 to 15.00 hrs. Apart from Bombay based boats, from Karanja and Uran also land their catches at Sassoon Dock.

MATERIAL AND METHODS

According to the survey programme, 10 to 12 observations of 6 hours duration each were made at Sassoon Dock every month. Data were collected from 12.00 to 18.00 hrs. on the first day and 0.6.00 to 12.00 hrs. on the following day. The night landings were recorded after enquiry. Catches of each type of selected units were examined in detail to determine

GEAR AND CRAFT

The Bag net locally known as 'Dol' is lowered and hauled depending upon the turn of the tides. A strong tidal current is very essential for the proper operation of the net. The mouth of the net is always in the direction of the tide and the bag net functions as a filter to retain the fish. The strong tidal current prevents the fish from escaping from the bag net (Bapat 1970).

Two types of boats are used at Sassoon Dock, mechanised and non-mechanised. The non-mechanised boats are further divided into canoes and said boats. The mechanised boats are of Machva type, Satpati type and Bassein type. They are propelled by diesel engines of 25 to 30 H.P. They save considerable time in going to the fishing grounds and back and can take advantage of 2-3 tides. In Sassoon Dock, 98% of the mechanised boats are used for 'Dol' net operation.

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RESULTS

Catches from 997 boats were examined for estimating the total catch, catch composition and weight of different species. Table 1 gives the number of observations per month, total number of dol nets observed with their percentage, the estimated total landings of dol net and the other types of units operated.

the catch shows a declining trend, the maximum being in July (Fig. 2). In July, the fishing operations were maximum (80.2%) and the highest catch of 1485 tonnes were landed, with *H. nehereus* contributing to 69.4% of the total catch.

The monthly landings of dol net in Sassoon Dock fluctuated between 275.347 tonnes (June) to 1485.006 tonnes (July) with an average

TABLE 1

MONTHWISE ESTIMATED DOL (BAG) NET CATCH OF SASSOON DOCK FOR THE YEAR 1971

Year 1971	No. of days of observa- tion (24.00 hrs)	Total num- ber of Dol units during the period of observa- tion	Total number of Dol units observed	Percentage of Dol units observed	Monthly estimated total catch of			Dol and other units (in tonnes)	
					Dol net catch	Percentage of the Dol units	Trawl catch	Dalti or Gill net catch	Hook and Lines
January	5	363	92	25.3	719.587	40.2	792.400	174.948	101.368
February	4	189	53	28.0	343.686	26.7	671.988	202.293	68.915
March	5	341	116	34.0	632.620	38.8	867.538	95.038	34.148
April	4	271	78	28.8	495.145	32.2	879.669	100.012	60.862
May	4	274	58	21.1	1381.987	46.9	1447.808	101.212	17.077
June	5	295	55	18.7	275.347	53.6	189.888	30.359	17.669
July	6	1061	121	11.4	1485.006	81.3	311.316	16.686	14.136
August	6	1019	135	13.2	1281.349	69.4	451.153	89.571	23.503
September	6	604	75	12.4	1126.085	47.2	1185.665	64.110	8.955
October	6	422	72	17.1	855.498	25.6	2065.193	365.530	49.296
November	6	474	80	16.8	787.750	25.4	2076.260	174.010	59.520
December	6	269	62	23.0	569.994	32.8	1008.514	69.809	88.145
Total		997			9954.054		11947.392	1483.578	543.594

It is seen from the table No. 1 the estimated total catch for the year 1971 amounted to 23928.618 tonnes of which 9954.054 tonnes (41.6%) were contributed by dol nets, 11947.392 tonnes (49.9%) by trawl nets, 1483.578 tonnes (6.2%) by Daldi or gill nets and 543.594 tonnes (2.3%) by hook and lines. A marked monthly fluctuation is seen during January-June and in August-December

of 829.5 tonnes (Fig. 2). During the monsoon months, Dol net catches showed an increase for the following reasons:

1. Number of 'Dol' units in operation during the monsoon months were considerably more as boats of nearby fishing villages also operated near Bombay harbour which is a protected area.

2. The landing of *H. nehereus* was higher

in July, August and September (1031.8, 944.2 and 911.7 tonnes).

3. *Palaemon tunuipes* was caught in large quantities in the months of May, July and August the catch being 646.3, 54.0 and 66.4 tonnes respectively. The share of *Hippolysmata*

sp. was quite high in the months of May, August and September (11.9, 16.4 and 10.4 tonnes. table No. 3).

The quarterwise catch composition of fish caught in Dol net is given in Table 2. *H. nehereus* and non-penaeid prawns together

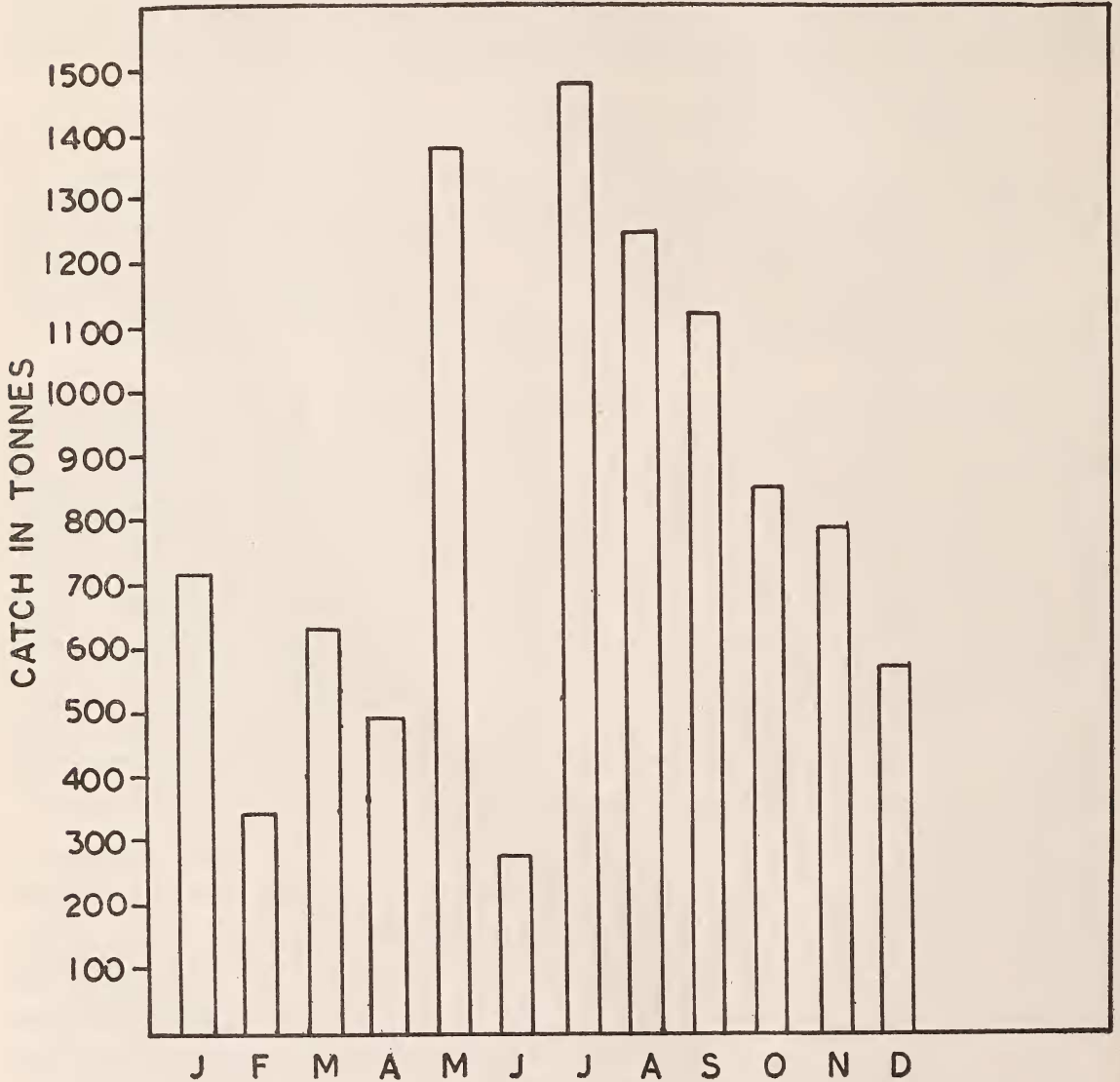


Fig. 2. Monthly fluctuations of fish caught in Dol (bag) net 1971.

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TABLE 2

QUARTERWISE PERCENTAGE COMPOSITION AND LIST OF SPECIES CAUGHT IN DOL NET IN 1971

Sl. No.	Species	Jan.-Mar. Ist Quarter	Apr.-June IInd Quarter	July-Sept. IIIrd. Quarter	Oct.-Dec. IVth. Quarter	Yearly Compo- sition
1.	Shark and Rays	0.52	0.37	0.36	0.30	0.39
2.	<i>Coilia dussumieri</i>	10.19	6.30	3.32	4.81	5.47
	Other clupeids					
3.	<i>Chirocentrus</i>	} 8.86	} 2.26	} 0.81	} 4.78	} 3.39
4.	Sardines, 5. <i>Hilsa toli</i>					
6.	<i>Thrissiocles</i>					
7.	<i>Dussumieria acuta</i>					
8.	<i>H. nehereus</i>	0.79	9.26	74.19	15.85	34.67
9.	Small sciaenids	} 1.63	} 2.05	} 0.63	} 2.66	} 1.57
10.	<i>P. sciaena</i>					
11.	<i>O. brunneus</i>					
12.	<i>P. hasta</i>	—	—	—	0.79	0.18
13.	<i>Trichiurus</i> spp.	2.08	2.90	1.21	7.68	3.17
14.	<i>Cybium</i> spp.	0.54	0.36	0.11	0.19	0.27
15.	<i>Stromateus</i> spp.	2.91	2.89	0.50	2.41	1.85
16.	<i>Bregmaceros</i> sp.	9.59	0.18	0.04	1.55	2.04
17.	<i>Arius</i> sp.	} 0.38	} 1.25	} 0.37	} 0.65	} 0.53
18.	<i>Lactarius lactarius</i>					
19.	<i>Caranx</i> sp.					
20.	<i>Cynoglossus</i> sp.					
21.	<i>M. cordyla</i>					
22.	<i>A. indicus</i>	56.01	32.05	10.79	51.26	32.09
23.	<i>P. tunuipes</i>	—	34.32	3.48	—	8.78
24.	<i>Hippolysmata</i> sp.	—	0.67	0.76	0.36	0.52
25.	Penaeid prawns	5.88	3.91	3.40	4.74	4.22
26.	<i>Solenocera indica</i>	0.23	0.26	0.02	0.23	0.16
27.	Cephalopods	0.10	0.06	—	1.26	0.31
	Other fishes					
28.	Eels	} 0.29	} 0.91	} 0.01	} 0.48	} 0.39
29.	<i>Upeneus</i> spp.					
30.	<i>Polynemus</i> spp.					
31.	Lobster					
32.	<i>Trypauchen vagina</i>					
33.	Miscellaneous					

contributed to 62.91%, 80.47%, 92.64% and 72.44% for the four quarters respectively.

In the first quarter, *A. indicus* dominated (56.01%) in the catch and penaeid prawn including *Solenocera indica* (0.23%) formed

6.11%. *H. nehereus* was caught in very small quantities (0.79%) which was compensated by significant increase of *Coilia dussumieri* (10.19%), other clupeids (8.86%) and *Bregmaceros* sp. (9.59%). The important species

were *Stromateus* spp., *Trichiurus* spp. and Sciaenids accounting for 2.91, 2.08 and 1.63% respectively. The share of rest of the fishes is 1.83%.

In the second quarter, *H. nehereus* catch

increased from 0.79 to 9.26% and *A. indicus* decreased from 56.01 to 32.05% and together formed 41.31% of the total catch. *P. tunuipes* showed an increase and ranked first 34.32%. The non-penaeid prawns *A. indicus*, *P. tunui-*

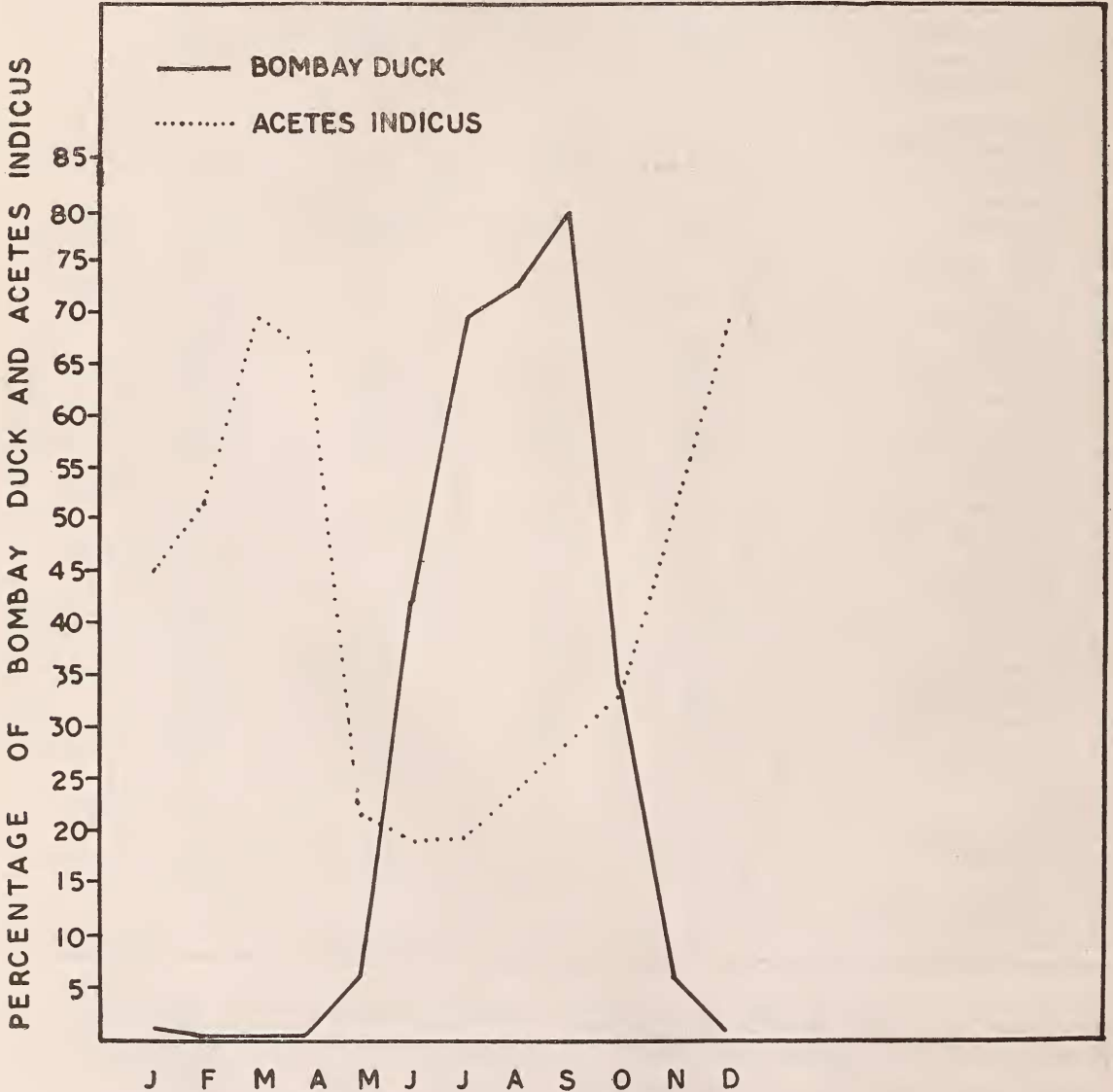


Fig. 3. The monthly percentage composition of Bombay duck and *Acetes indicus* in the Dol net catch at Sassoon dock, Bombay showing the inverse relationship.

CATCH COMPOSITION (Percentages)

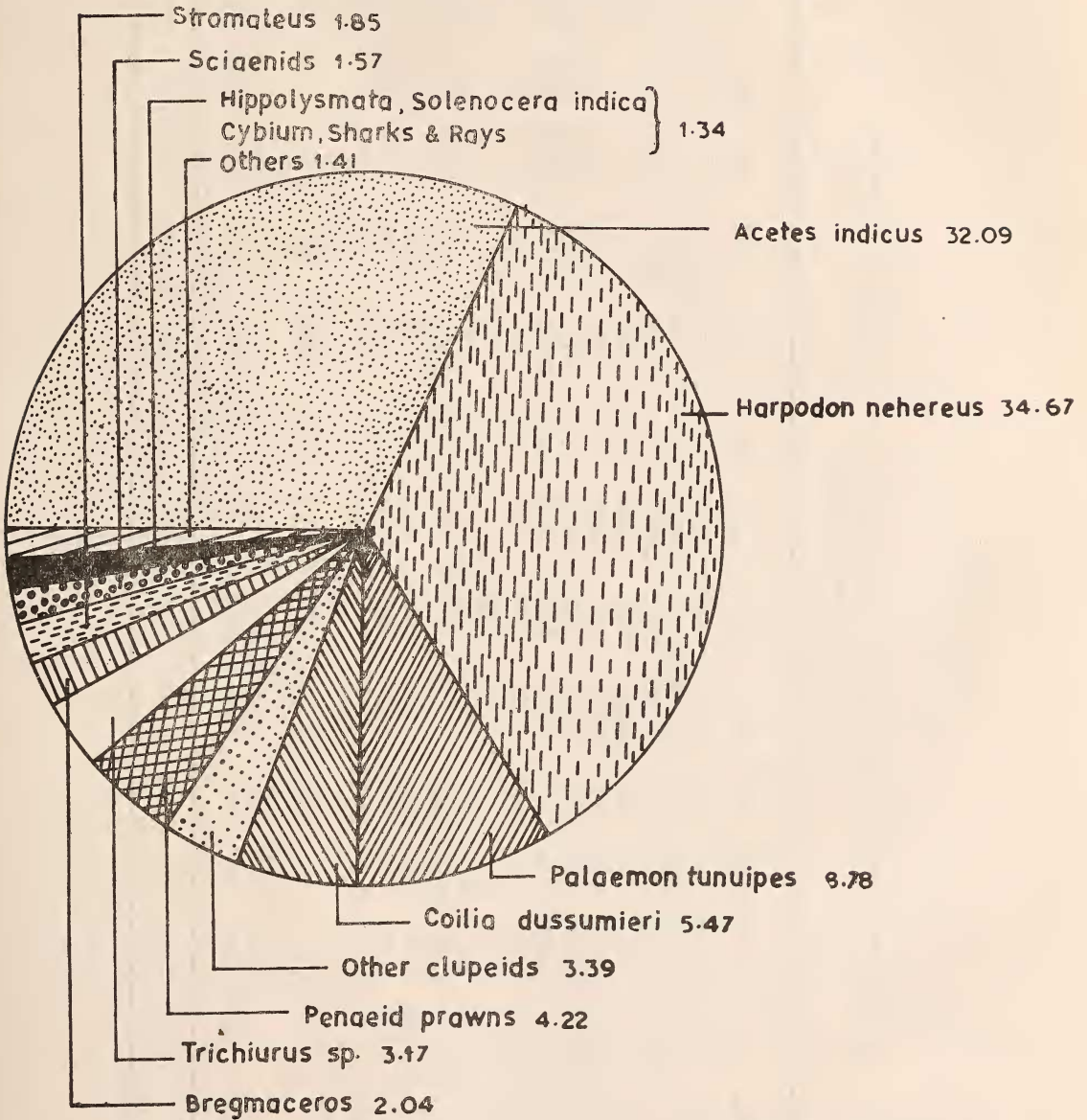


Fig. 4.

TABLE 3

MONTHWISE SPECIES COMPOSITION OF FISH CAUGHT IN DOL (BAG) NET IN SASSOON DOCK FOR THE YEAR 1971 (CATCH IN KG)

Sl. No.	Species name	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total	%
1.	<i>H. nehereus</i>	8587	1330	3495	2767	79146	117480	1031814	944298	911705	291803	46980	12216	3451621	34.67
2.	<i>A. indicus</i>	326696	178633	444580	332145	304792	52980	287700	76575	55985	297879	408750	427950	3194665	32.09
3.	<i>P. tunuipes</i>	—	—	—	38962	646395	53442	54060	66440	15055	—	—	—	874354	8.78
4.	<i>C. dussumieri</i>	46301	75131	51496	28725	100770	6174	24888	47009	57560	36518	51700	18270	544542	5.47
5.	Other clupeids	105038	24409	20929	15337	26311	7079	9426	13111	9320	21607	57110	27270	336947	3.39
6.	Penaeid prawns	38656	18480	41650	18592	58163	7566	29778	82244	20585	33449	48580	22905	420648	4.22
7.	<i>Trichiurus</i> spp.	21582	5313	8497	26887	33285	2442	17274	13884	16235	103354	53510	13320	315583	3.17
8.	<i>Bregmaceros</i> sp.	137274	6937	18452	2820	1162	—	768	226	745	3224	9990	21150	202748	2.04
9.	<i>Stromateus</i> spp.	13869	12425	23119	9480	51150	1656	4314	2544	12610	15841	30440	7043	184491	1.85
10.	Sciaenids	12219	7574	7893	9900	29123	5166	9468	7549	7720	24149	24700	10171	155632	1.57
11.	Shark and rays	2653	3710	2452	1867	4538	1650	4398	5829	3970	3100	1530	2093	37790	0.39
12.	<i>Cybiium</i> spp.	—	—	—	605	5992	180	3948	324	335	115	2090	2160	25962	0.27
13.	<i>Hippolysmata</i> sp.	—	—	—	705	11978	1824	2682	16469	10480	6975	825	270	52208	0.52
14.	<i>Solenocera indica</i>	—	574	3386	1440	2520	1704	—	803	—	—	4030	1148	15605	0.16
15.	Other Fishes	2676	7238	3426	3913	26662	16004	4488	4044	3780	17484	47515	4028	141258	1.41
		719587	343686	632620	495145	1381987	275347	1485006	1281349	1126085	855498	787750	569994	9954054	100

pes and *Hippolysmata ensirostris* together contributed 67.04%. Penaeid prawns including the *Solenocera indica* (0.26%) formed 4.17%. *C. dussumieri* and other clupeids together formed 8.56%. *Stromateus* spp. constituted 2.89%, *Trichiurus* spp. 2.90% Sciaenids 2.05% and remaining fishes 3.13%.

In the third quarter *H. nehereus* formed bulk of the catch 74.19% while *A. indicus* (10.79%), the other non-penaeid prawns *P. tunuipes* (3.48%) and *H. ensirostris* (0.76%) constituted 15.03%. The share of penaeid prawn including *S. indica* was 3.42%. *C. dussumieri* and other clupeids formed 4.13% and *Trichiurus* spp. 1.21%. The decline of *C. dussumieri* and *Bregmaceros* sp. in the third quarter may mainly due to the abundant of *H. nehereus* while the former formed the important food items of Bombay duck next to *A. indicus* (Bapat 1970). The share of the rest of the fishes is 2.02%.

In the fourth quarter *A. indicus* dominated (51.26%) in the catch. *H. nehereus* declined to 15.85%. The penaeid prawns including the *Solenocera indica* (0.23%) formed 4.97%. The landings of *C. dussumieri* increased from 3.32% to 4.81% and other clupeids from 0.81% to 4.78%. The share of *Trichiurus* spp. was very high (7.68%). Catches of *Bregmaceros* sp. increased from 0.04% to 1.55%. The contributions of sciaenids and *Stromateus* spp. formed 2.66 and 2.41% respectively. The cephalopods improved to 1.26% and rest of the fishes contributed 2.77%.

In the monthly 'Dol' net catch *H. nehereus* fluctuated between 0.4 to 81% and *A. indicus* between 5.0 to 75%. *H. nehereus* and *A. indicus* showed an inverse relation in the catch composition (Fig. 3). The possible explanation for this inverse relation may be the grazing by Bombay duck as *A. indicus* is one of the principal components of its food (Bapat 1970).

Among the different species, *H. nehereus* takes the first place in the 'Dol' net catch. The annual average composition was 34.67% (Fig. 4). July showed the highest monthly catch followed by August, September (Table 3) and caught throughout the year in the Dol net. *A. indicus* was next in importance (32.09%). It dominated during October to May with a maximum catch in March (444.5 tonnes). *P. tunuipes* was third in importance (8.78%) and was noticed in the catch from April to September. Among clupeids *C. dussumieri* occupied the first place and formed 5.47% of the Dol net catch. Other Clupeids like *Chirocentrus* spp., *Hilsa toli*, *Dussumieria acuta* and sardines together contributed 3.39%. Penaeid prawns occupied the fifth place forming 4.22% of the total catch and consists of *Metapenaeus brevicornis*, *P. sculptiles*, and *P. stylifera*. The ribbon fish took the sixth place and consists largely of juveniles of *T. haumela* and *T. savala* forming 3.17%. *Bregmaceros* sp. occupied the seventh place and formed 2.04% of the total catch, occurring throughout the year. Among the three species of *Stromateus*, *S. cinereus* was caught in large quantities. They generally consisted of juveniles forming 1.85%. Small sciaenids like *Johnius carutta*, *Johnius sina*, *Otolithus argenteus*, *O. ruber* and large one like *Pseudosciaena diacanthus* and *Otolithodites brunneus* together formed 1.57%. Sharks and rays (0.39%) and *Cybium* (0.27%) were caught in small quantities in all the months of the year. *Hippolysmata* and *Solenocera indica* together formed 0.68%. The rest of the fishes formed 1.41% of the total catch. *Trypauchen vagina*, *Palaemon stylifera* and *Squilla* species occurred in small quantities in monsoon months only.

The Dol net catch is categorised into the following grades based on the consumer preference, of class I fish 8.32% consisting of

penaeid prawn, *Stromateus* spp. and *Cybium*; class II fish 51.23% consisting of *P. tunuipes*, *H. nehereus*, *Hippolysmata*, *Solenocera*, *Coilia* etc. Class III fish 2.73% consisting of Sciaenids, *Thrissocles* etc. and class IV fish 37.68% consisting of *A. indicus* and *Trichiurus* etc. The non-edible fish *Trypauchen vagina* comprised 0.04%. The list of 33 species caught in Dol net catch and their annual percentages are given in the Table 3.

REMARKS

The increase or decrease in the monthly catch during the year has been mainly due to fluctuation of *H. nehereus* and *A. indicus*. These together with other prawns contributed

to 80.44% of the total Dol net catch. The inverse relationship observed in the landings of *H. nehereus* and *A. indicus* is an interesting feature and detailed studies are necessary to determine the factors causing the same.

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